Exemption No. 8248

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056

In the matter of the petition of **Structural Integrity Engineering** for an exemption from §§ 25.812(e), 25.812(h), 25.813(b), 25.857(e), 25.1447(c)(1) and 25.1449 of Title 14, Code of Federal Regulations	Regulatory Docket No. FAA-2003-16538

PARTIAL GRANT OF EXEMPTION

By letter dated September 9, 2003, Gary DeSantis, Structural Integrity Engineering, 9525 Vassar Avenue, Chatsworth, California 91311, petitioned the Federal Aviation Administration for an exemption from the following sections of Title 14, Code of Federal Regulations (14 CFR): §§ 25.812(e), 25.812(h), 25.813(b), § 25.857(e), 25.1447(c)(1), and 25.1449. The requested exemption, if granted, would permit relief from these regulations to allow carriage of 7 non-crewmembers (commonly referred to as supernumeraries) in a compartment behind the flight deck on Boeing Model 757-200 airplanes which have been converted from a passenger to a freighter configuration. The petition states that, in addition to the pilot and the co-pilot, 2 persons who meet the requirements of § 121.547 will occupy the flight deck. Part 25 in general and § 25.857(e) in particular do not prohibit these persons from occupying the flight deck. Therefore, this document does not address the occupancy of these persons on the flight deck.

Sections of the FAR affected:

> Section 25.785(j), Amendment 25-88, requires, in pertinent part, that there be a firm handhold to enable occupants to steady themselves when moving through the aisles in moderately rough air.

Section 25.812(e), Amendment 25-88, requires floor proximity emergency egress lighting in passenger areas.

Section 25.813(b), Amendment 25-88, requires that each emergency exit addressed by § 25.810(a) have adjacent assist space.

Section 25.857(e), Amendment 25-93, limits Class E cargo compartments to all-cargo airplanes.

Section 25.1447(c)(1), Amendment 25-87, requires that oxygen dispensing units must be automatically presented to the occupants before the cabin altitude exceeds 15,000 feet. The total number of dispensing units and outlets must exceed the number of seats by at least 10 percent.

Section 25.1449, requires that there be a means to allow the crew to determine whether oxygen is being delivered to the oxygen dispensing units.

Related Sections of the FAR:

Section 121.583(a)(1) through (a)(7) contains, in pertinent part, a listing of categories of people who may be carried aboard an airplane in part 121 service without complying with all the requirements of part 121 for passenger-carrying airplanes.

The petitioner's supportive information is as follows:

Under the subject FAA Project, Structural Integrity Engineering (SIE) is the applicant for an STC for conversion of a Boeing 757-200 aircraft from a passenger to a freighter aircraft. A Partial Grant of Exemption was granted to SIE in Exemption Number 8077 in Regulatory Docket No. FAA-2003-14299. Exemption No. 8077 was for a '15 pallet' freighter. This letter is requesting similar relief from the requirements of certain sections of 14 CFR Part 25 regulations for the Boeing Model 757-200 series passenger airplanes converted to '14 pallet' freighter. The exemptions requested herein are essentially a subset of the aforementioned granted exemptions. They are being requested, because the '14 pallet' aircraft has different design details than the '15 pallet' aircraft.

As a part of the STC application process, SIE has identified, and reviewed with the FAA, the Title 14, Code of Federal Regulations relevant to this effort. These are contained in the Project Specific Certification Plan (PSCP), SIE Report Number 69-001, revision E.

In the '14 pallet' configuration, the existing L1 and R1 doors will be maintained with all of their emergency evacuation equipment. A 9G rigid barrier will be installed just aft of the L1 door, permitting L1 and R1 door use in an emergency evacuation. A Class E cargo compartment will be installed. There are

supernumerary seats just forward of the 9G barrier and aft of the flight compartment of the airplane. This area will allow the carriage of up to seven persons. These seven people are in addition to the two crewmembers and up to two additional persons allowed admission to the flight deck under 14 CFR 121.547.

A smoke barrier will be installed on the 9G rigid barrier to comply with the smoke penetration requirements. The supernumeraries will have a separate independent oxygen system from that of the flight deck. An aural announcement system will be installed in the areas of the cargo compartment that the supernumeraries are permitted. This will ensure that the flightcrew can provide the appropriate warnings to the supernumeraries.

This petition is presented for relief from the requirements of the following sections of 14 CFR Part 25 regulations for the Boeing Model 757-200 series passenger airplanes converted to freighters.

1. Section 25.812(e), and (h);

2. Section 25.813(b);

3. Section 25.857(e);

4. Section 25.1447(c)(1),

5. Section 25.1449

Supporting Information - Section Requirements

Section 25.812(e), Amendment 25-88, requires floor proximity emergency lighting in passenger areas, and paragraph (h)(1) requires that each passenger exit requiring assist means include a means to illuminate the expected evacuee alighting zone.

Section 25.813(b), Amendment 25-88, requires that each emergency exit addressed by Section 25.810 (a) must have adjacent assist space.

Section 25.857(e), Amendment 25-93, limits Class E cargo compartments to all-cargo airplanes.

Section 25.1447(c)(1), Amendment 25-00, requires that passenger oxygen masks be automatically presented upon cabin depressurization.

Section 25.1449, Amendment 25-00, requires crew to have a means to determine whether oxygen is being delivered to the dispensing equipment.

The following sections of 14 CFR Part 121 are related to the above requirements.

Section 121.583 contains, in pertinent part, a listing of the categories of people who may be carried aboard an airplane in Part 121 service without complying with all the passenger carrying airplane requirements of Part 121.

Section 121.329(b)(1) and Section 121.333(b) contain operational oxygen requirements for revenue operators.

Information to Support Grant of Exemption

1. Per the revisions of Section 121.583 covering the persons that may be carried on this airplane, all persons will have special training, including proper methods for egress from the airplane, use of emergency equipment, and flight operations associated with controlling fires in Class E cargo compartment.

2. The 9G rigid barrier will include means to comply with the smoke penetration requirements. A placard indicating that this smoke barrier is to be closed when there are no occupants past the smoke barrier, will be located in a conspicuous place on or next to the smoke barrier.

3. Admission to the flight deck of the '14 pallet' freighter will be limited to those people that meet the requirements of Section 121.547, "Admission to the fight deck." The flight deck is equipped with open-able left and right flight deck windows previously certified as flight crew emergency exits. For these exits the ropes / lanyards installed at the widows will be retained as the emergency egress assist means.

4. The occupancy of the '14 pallet' freighter is limited to a total of eleven (11) persons, seven of whom may be "supernumerary" occupants as defined by Section 121.583 (a)(1) through (a)(7), and four of whom are permitted on the flight deck as defined by Section 121.547. Limitations will be imposed on the aircraft operator to find that all occupants are physically able to use the escape means provided.

5. There are no flight attendants who would normally utilize the required assist space. Therefore, the lack of assist space adjacent to the emergency exits will not lower the level of safety in an emergency egress situation.

6. It is the intent to allow the operator to use the supernumerary capability of the airplane to ferry up to seven occupants. When supernumerary occupants are carried, they will be briefed prior to each flight as to the location and use of the emergency egress procedures.

7. All occupants in the aircraft will have available the same quick-donning flight crew-type oxygen masks that are not automatically presented. The high level of training of the supernumeraries and the aural warning system will allow the crew to command non-operating occupants to don the masks.

8. Due to the special training of the supernumeraries as to operation of the oxygen system, they can ensure oxygen is delivered to the dispensing equipment for a degree of safety that would not be enhanced by crew determination.

Additional Supporting Information - Emergency Egress:

For the '14 pallet' configuration, the existing Ll and Rl doors will be maintained with all of their emergency evacuation equipment. Additionally, the Operations Manual will include limitations upon the Operator to find that all occupants are physically able to use the egress means provided.

Additional Supporting Information - Emergency Egress - Lighting & Signage:

The entry area emergency exit signage includes downward directed illumination of the floor at the crew entry door. Emergency egress path marking lights will not be installed, as the proximity of the occupants to the Ll and Rl doors provides a level of safety that would not be enhanced for 7 persons by installation of floor proximity emergency egress lighting.

All signage, lights, and placards indicating other exits will be removed or permanently modified to delete such indication.

Additional Supporting Information - Oxygen System and Capacity

The crew oxygen system on the '14 pallet' freighter will be retained. The system is currently certified on the 757-200 passenger aircraft, and will be kept to serve the flight deck. The crew oxygen system will be a separate system with a separate source of supply for the supernumeraries. Both systems will have a demonstrated capacity sufficient to meet or exceed the requirements defined by Section 25.1439(b)(5), Section 121.329(b)(1), and Section 121.333(b) for the occupants it serves.

Additional Supporting Information - Instructions to Occupants:

The Airplane Flight Manual Supplement (AFMS) will require the crew to brief non-operating occupants on the safe use of the provided escape means prior to each flight.

The occupancy of the aircraft is limited to a total of eleven (11) persons, seven (7) of whom may be "supernumerary" occupants as defined by Section 121.583 (a)(1) through (a)(7). Limitations will be imposed on the aircraft operator to find that all

occupants are physically able to use the provided means of escape. This limitation will be included in the AFMS. The Operations Manual will contain illustrated sequences showing the recommended evacuation procedures for emergency egress through the passenger/ service door, which will be required to be briefed to all non-crew occupants prior to each flight.

Evaluation of Public Interest:

The presence of trained personnel when live or hazardous cargoes are carried aboard the aircraft will preserve proper flight safety, and is therefore in the public interest.

The cargo carrying capacity allowed by the inclusion of the rigid 9G barrier aft of the existing door 1 left and right constitutes a legitimate public interest for shipping customers, aircraft operators, and SIE. The grant of this exemption will improve the utility of the airplane for the operator by ensuring needed cargo management personnel will be available in flight and at each flight destination.

As these and other 757-200 Passenger airplanes are moved into cargo service, operators will replace them with passenger airplanes meeting newer safety requirements, which will tend to elevate safety levels across operating fleets. An overall elevation of safety is in the public interest.

Petition for Exemption

In consideration of the foregoing discussion, Structural Integrity Engineering petitions for exemption from the following portions of 14 CFR Part 25 for 757-200 Passenger airplanes converted to '14 pallet' freighter aircraft by FAA Project ST7269LA-T:

Section 25.812(e), Amendment 25-88, as the flight deck configuration cannot accommodate floor proximity emergency escape path marking, and the proximity of occupant seating to the emergency exits allows for a degree of safety that would not be enhanced by path marking;

Section 25.813(b), Amendment 25-88, the existing configuration does not allow for assist space near the emergency exits;

Section 25.857(e), Amendment 25-93, as persons in addition to the type certified flight deck crew may be carried.

Section 25.1447-(c)(1), Amendment 25-00, as special training of the supernumeraries the quick-donning oxygen masks that are supplied provide a degree of safety that would not be enhanced by automatically presented masks.

Section 25.1449, Amendment 25-00, as special training of the supernumeraries as to operation of the oxygen system can ensure oxygen is delivered to the dispensing equipment for a degree of safety that would not be enhanced by crew determination.

Structural Integrity Engineering respectfully requests the FAA's consideration of the foregoing petition. Additionally, we ask that the FAA Los Angeles ACO perform coordination necessary to obtain FAA concurrence and advisement for this petition."

Notice and Public Procedure Provided

On December 9, 2003, the FAA published notice of the petition for exemption in the Federal Register and requested comments from the public. No comments were received in response to the notice.

The FAA's analysis/summary is as follows:

The petitioner has requested relief primarily from the requirements of § 25.857(e), which permit carriage of cargo only when a Class E cargo compartment is installed on the airplane. Class E cargo compartments are usually remote from the flight deck and encompass the entire interior of the airplane. Controlling fires that might occur in the cargo compartment is done by starving the fire of oxygen. This is accomplished by depressurizing the airplane and maintaining an altitude that will not support combustion. For this reason, passengers are not permitted on airplanes with a Class E cargo compartment.

The petitioner has requested that 7 supernumeraries—as listed in the categories of persons specified in § 121.583(a)(1) through (a)(7)—be allowed to occupy an area forward of the Class E cargo compartment and aft of the flightdeck. The petitioner also states that— in addition to the pilot and co-pilot—2 persons who meet the requirements of § 121.547 will occupy the flight deck. Part 25 in general and § 25.857(e) in particular do not prohibit these persons from occupying the flight deck. Therefore, this document does not address the occupancy of these persons on the flight deck.

The certification regulations for transport category airplanes address airplane occupants as being either "crew" or "passengers." Due to differences in training, physical capabilities, and other factors (such as familiarity with the airplane), the means required by part 25 to address emergency evacuation and emergency equipment differ for passengers and crewmembers. With respect to part 25, because supernumeraries are not crewmembers, by default they must be considered "passengers." However, supernumeraries do hold a special status because of their training and other factors. The FAA, therefore, has granted certain exemptions to allow the carriage of supernumeraries on cargo airplanes without compliance with all of the part 25 standards for passengers, provided that certain other conditions are met. Those conditions have varied, depending

on the airplane design, the nature of the proposal under consideration, and the number and location of persons to be carried.

In all cases, there must be suitable means of preventing smoke penetration into areas that are occupied. The petitioner's design does this by providing a smoke barrier on a 9g rigid barrier that separates the Class E compartment from the supernumerary seating area. The petitioner has indicated that supernumeraries may enter the Class E cargo compartment during flight and, hence, open the smoke barrier. In order to provide an appropriate level of safety, the petitioner must install a placard which indicates that the smoke barrier is to be secured (i.e., the door or curtain must be closed) when there are no occupants in the Class E cargo compartment. This placard must be located in a conspicuous place either on or next to the smoke barrier. SIE indicates that it will install such a placard.

If access into the Class E compartment is allowed, an aural or visual annunciation, which is operated by the flightcrew and which would be recognized in the Class E cargo compartment, must be installed to indicate that persons must return to their seats and secure the smoke barrier (i.e., close the door or curtain) during a fire in the Class E compartment. Appropriate procedures and limitations would need to be established to ensure that the flightcrew signals the supernumeraries to return to their seats and secure the smoke barrier at the onset of a fire. The pre-flight briefing would need to explain this annunciation to the supernumeraries.

Due to the way that fire in the cargo compartment is to be controlled, it is necessary to limit persons on board the airplane to those who have been found physically fit by the operator and have been briefed on the use of emergency equipment. This limitation on the occupants is consistent with previous approvals and will be included in this approval.

Although not mentioned by the petitioner, § 25.785(j) requires handholds to enable passengers to steady themselves when moving about the cabin, in the event of moderate turbulence. If supernumeraries are not restricted from entering the Class E cargo compartment, this compartment must be considered in regards to the requirement for handholds, since persons may move about in it. The FAA recognizes that it would be impractical to require handholds in the Class E cargo compartment. We find that an acceptable level of safety for justifying an exemption will be provided without handholds, if a flightcrew-operated aural or visual annunciation in the Class E compartment indicates at the onset of turbulence that persons must return to their seats. This annunciation is not required, if an Airplane Flight Manual limitation is established to prohibit supernumeraries from being in the Class E compartment during flight.

The intent of § 25.812(e) is to provide floor proximity emergency escape path marking in the passenger areas of the airplane. The configuration of the converted Boeing Model 757-200 does not provide such marking, as required by § 25.812(e). However, both of the exits are close to the supernumeraries, and supernumeraries have a higher level of training and knowledge of the airplane configuration than does the typical passenger. The FAA finds that the configuration provides an acceptable level of safety.

On the second page of its petition, SIE lists §25.812(h) as one of the sections from which relief is sought. However, the petitioner does not provide details about the need for the exemption or describe any design features that do not comply with §25.812(h). The FAA contacted SIE for additional information, and SIE informed us that there is no need for an exemption from §25.812(h).

The forward left and right side passenger emergency exits and the associated slides will be retained in the supernumerary seating area. Section 25.813(b) requires an assist space next to these exits. The supernumeraries will have a higher level of training than a typical passenger and, therefore, would have less need for crew assistance. The FAA finds it acceptable that no assist spaces be provided in this case.

The FAA finds that supernumeraries should have a supplemental oxygen system that is comparable to that of passengers. However, taking into account the extra knowledge and training that supernumeraries will have, the FAA does not find that an equivalent system needs to be provided. The petitioner has indicated that an oxygen system which is independent of the flight deck oxygen system will be installed for use by the supernumeraries in their seating area. The petitioner also indicates that quick-donning, flightcrew-type masks will be provided. Details of the oxygen system design are not provided, but the FAA contacted the petitioner for additional information about the system. SIE indicated that the supernumeraries will activate the oxygen flow. The FAA finds this approach acceptable, provided that the means to activate oxygen flow is simple (e.g., turning a knob on an oxygen bottle). Section 25.1447(c)(1) requires that oxygen be "immediately available" to each seated occupant. Hence, each supernumerary must be able to don a mask and activate the oxygen flow while seated.

Configurations may be approved that will allow the supernumeraries to leave their seats and enter the Class E cargo compartment. In terms of the "immediately available" requirement of § 25.1447(c)(1)—in order to provide an acceptable level of safety—each supernumerary must carry on his or her person a portable oxygen bottle with a mask connected to it while in the Class E cargo compartment.

Section 25.1447(c)(1) also requires automatic presentation of the oxygen dispensing units. For seated passengers in typical passenger airplanes, the automatic presentation of masks throughout the cabin indicates the need to don an oxygen mask. Supernumeraries on the petitioner's converted 757-200 freighter airplanes will not have this indication. To provide an acceptable level of safety, an automatically activated aural decompression signal must be immediately recognizable throughout the supernumerary seating area and—if access is allowed—in the Class E cargo compartment. Operation of this signal must be automatic with flightcrew manual action as a backup.

Supernumeraries must be trained on the location and use of the oxygen equipment and the signals for its use. Additionally, oxygen units must be sized adequately for continuous and uninterrupted use during worst-case flight duration following a decompression, including a decompression used to suppress a fire.

Section 25.1447(c)(1) requires that there be ten percent more oxygen masks than occupants. The FAA considers that the rationale behind this requirement does not apply in this case.

Section 25.1449 requires that there be a means to allow the crew to determine whether oxygen is being delivered to the dispensing equipment. For passenger oxygen systems, an acceptable means of compliance is for the flight attendants to determine whether the oxygen is being delivered to the passenger dispensing equipment. There will be no flight attendants carried on these airplanes. However, the supernumeraries will have a higher level of training than a typical passenger; therefore the FAA finds it acceptable for the supernumeraries to determine whether oxygen is being delivered to the dispensing equipment.

The Partial Grant of Exemption

In consideration of the foregoing, I find that a partial grant of exemption is in the public interest and will not affect the level of safety provided by the regulations. Therefore, pursuant to the authority contained in 49 U.S.C. §§ 40113 and 44701, delegated to me by the Administrator, Structural Integrity Engineering is hereby granted a partial exemption from §§ 25.785(j), 25.812(e), 25.813(b), 25.857(e), 25.1447(c)(1), and 25.1449. The petition is granted to the extent required to permit type certification of Boeing 757-200 airplanes which have been converted from a passenger to freighter configuration with provisions for the carriage of supernumeraries. The following limitations apply and, except for limitation 7, must be documented in the limitations section of the Airplane Flight Manual (AFM):

1. Occupancy outside of the flight deck is restricted to a maximum of 7 persons.

2. Occupants are limited to the categories specified in § 121.583(a)(1) through (a)(7).

3. Each supernumerary must be briefed by a flight crewmember on the use of the exits and emergency equipment prior to each flight.

4. The operator must determine that each supernumerary is physically able to accomplish the necessary emergency procedures.

5. Supplemental oxygen equipment with connected masks must be located so that each supernumerary can don a mask and activate the oxygen flow while seated. The means of activating the flow must be simple. The supernumeraries must be trained in the use of the oxygen equipment.

6. Each supernumerary must be provided with a portable oxygen unit with a mask attached to it that he or she carries whenever he or she is in the Class E cargo compartment. The portable oxygen units may be located in a common area or may be the same units installed at the supernumerary seats. The supernumeraries must be trained in the use of these oxygen units.

7. The oxygen units installed at the supernumerary seats must be sized adequately for continuous and uninterrupted use during worst-case flight duration following a decompression, including a decompression used to suppress a fire.

8. An automatically activated aural decompression signal immediately recognizable (considering ambient noise during flight) throughout the supernumerary seating area and any accessible area in the Class E cargo compartment must be provided to notify supernumeraries when to don oxygen masks. This signal is not required to be recognizable in the Class E compartment, if an Airplane Flight Manual limitation is established to not allow supernumeraries in the Class E compartment during flight. This signal and the accompanying procedures for donning a mask and activating oxygen flow must be included in the pre-flight briefing.

9. There must be a means to allow the supernumeraries to determine whether oxygen is being delivered to their dispensing equipment. The supernumeraries must be trained in the means to determine the oxygen is being delivered.

10. A flightcrew operated aural or visual annunciation which is recognized (considering ambient noise during flight) in accessible areas in the Class E compartment must be installed to indicate during turbulence that persons must return to their seats. Appropriate procedures and limitations must be established to ensure that the flightcrew signals the supernumeraries to return to their seats at the onset of turbulence and prior to landing. The pre-flight briefing must explain this annunciation to the supernumeraries. This briefing, annunciation, and the associated procedures and limitations are not required, if an Airplane Flight Manual limitation is established to prohibit supernumeraries in the Class E compartment during flight.

11. A flightcrew operated aural or visual annunciation which is recognized (considering ambient noise during flight) in the Class E cargo compartment must be installed to indicate during a fire in the Class E compartment that persons must return to their seats and to ensure that the smoke barrier is secured (i.e., the door or curtain is closed). Appropriate procedures and limitations must be established to ensure that the flightcrew signals the supernumeraries to return to their seats and secure the smoke barrier at the onset of a fire. The pre-flight briefing must explain this annunciation to the supernumeraries. This briefing, annunciation and the associated procedures and limitations to signal the supernumeraries are not required, if an Airplane Flight Manual limitation is established to prohibit supernumeraries in the Class E compartment during flight.

12. A placard must indicate that the smoke barrier must be secured (i.e., the door or curtain must be closed) when the Class E cargo compartment is not occupied. The placard must be located in a conspicuous place either on or next to the smoke barrier. The pre-flight briefing must inform supernumeraries of this requirement and whether or not they may enter the Class E cargo compartment.

Issued in Renton, Washington, on February 4, 2004.

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Kevin Mullin
Acting Manager
Transport Airplane Directorate
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